CHAPTER 7

REPORTING REQUIREMENTS

7-1. General.

Reporting requirements for the several types of studies are described in applicable Engineer Regulations. In addition hydrologic and hydraulic Engineering Technical Letters (ETL's) summarize the array of hydrologic data that must be presented for planning reports and suggest display formats. The goal of reporting (investigation findings) should be to describe in basic terms the nature of the flood problem, status and configuration of existing system, proposed system and alternatives, performance characteristics of proposed system, and important operation plans. This chapter suggests a general structure for reporting results of the hydrologic studies commensurate with the basic concepts of planning and design studies. Note that it is occasionally suggested that economic and other data be included so that the consequences of the hydrologic evaluations may be better judged.

7-2. Planning Considerations.

a. General. Hydrologic reporting requirements for feasibility investigation should include a description of the without conditions, alternative flood loss reduction plans analyzed, analytical procedures and assumptions used, and system implementation and operation factors influencing the hydrologic aspects of the study.

b. Existing System. The existing system will be defined and displayed schematically and by the use of maps, tables, and plates. The layout of the existing location of pumping stations, primary gravity outlets, detention storage basins, and conveyance networks shall be indicated on aerial photographs or other suitable cartographic materials. Important environmental aspects, damage locations, and cultural features will also be indicated.

c. Without Conditions.

(1) Physical characteristics and features of existing condition flood loss mitigation measures will be described and shown in tables and plates. Dimensions of gravity outlets, channels, and other measures shall be specified. Area capacity (storage-area-elevation) data of detention storage areas will be presented. Watershed and subbasin boundaries will be shown on a plate or map.

(2) The hydrologic analysis approach adopted, critical assumptions, and other analysis items for existing conditions will be described and illustrated as necessary. Historic and/or hypothetical storms, loss rate parameters, runoff transform parameters, routing criteria, and seepage will be described and depicted via tables and plates. Hydrologic flow characteristics, peak discharge, duration, frequency and velocity information will be presented for

important locations (damage centers, high hazard areas, locations of potential physical works). Schematic flow diagrams indicating peak discharges for a range of events will be included for urban areas. Presentation of several hydrographs of major hydrologic events, including precipitation and loss rates and runoff transforms, can greatly assist in explaining the nature of flooding.

(3) Future without conditions will be described as they impact on hydrologic conditions, assumptions, and procedures. Changes in runoff and operation resulting from future conditions will be described in terms similar to the existing conditions description of paragraph 7-2.c(2). Procedures adopted for parameter estimation for future conditions will be described.

d. Hydrologic Analysis of Alternatives.

(1) The location, dimensions, and operation criteria of components of the alternative plans will be described and depicted on tables and plates. Locations of the alternative measures or plans will be displayed on aerial photographs and/or other cartographic materials so that comparisons with existing conditions may be readily made. Impacts of measures and plans on flood hydrographs (peaks, durations, velocities) for a range of events will be provided at similar locations as for without conditions. Display of the effects on hydrographs of paragraph 7-2.c(2) above should be included. Display of residual flooding from large (one-percent chance and Standard Project flood) events is required. Also include tables of pumping rates that impact on flood hydrographs and stages.

(2) The hydrologic description of the various alternative plans will include a description of the required local agreements and maintenance requirements. The hydrologic consequences of failure to adequately fulfill these requirements will also be presented.

7-3. Design Considerations.

a. Hydrologic material presented in the design documents (GDM and FDM) will describe in detail the hydrologic system, and any refinements of sizes, performance standards, and operation criteria from the feasibility study. The hydrologic requirements for the GDM are specified in ER 1110-2-1150 (10) and summarized in the following paragraphs.

(1) Present the basis and results of hydrologic and hydraulic studies requred to determine the functional design and real estate requirements of all water control projects.

(2) Hydrologic studies should include: discharge-frequency relationships; Standard Project and perhaps the Probable Maximum floods; stage-discharge relationships; flow duration; inundation limits; freeboard determinations; existing and post-project sedimentation; water quality and groundwater conditions; project regulation plan; real estate guide taking line elevations; criteria for relocations and other flowage right determinations; and criteria for guidance and support of local assurance requirements.

(3) The residual flood condition with the selected plan in place will be described. As a minimum, the information will include the following: warning time of impending inundation; rate-of-rise, duration, depth andvelocity of inundation; delineation of the best available mapping of the flood inundation boundaries; identification of potential loss of public service; access problems; and potential damages. This information will be developed for each area of residual flooding for historic, Standard Project Flood, one- percent chance flood and the flood event representing the selected level of protection. This information will be incorporated into the operation and maintenance manual for the project and disseminated to the public.

(4) Hydraulic study results to be presented include: water surface profiles; headloss; velocity; pressure conditions; structural sizing for design capacities; water control facilities; energy dissipating facility details; and erosion control requirements.

(5) For coastal projects, tidal fluctuations and overtopping conditions should be defined.

b. Feature design memorandum reporting requirements for hydrologic analyses are summarized below (Reference 10):

(1) A summary of project data applicable to the feature being presented.

(2) Basic data and criteria used in the design, referring to the GDM, applicable engineer manuals and regulations, guide specifications, and other sources of criteria.

(3) Design drawings, sketches, charts, diagrams, maps, profiles, or other graphic data necessary to illustrate the design. The maps should clearly identify all places and names mentioned in the text of the design memorandum.

(4) Results of investigation, analyses, and engineering computations made for the design of essential parts or items. The information will include: formulas, methods, and assumptions used to determine pertinent design features, flow characteristics, and discharge capacities. Also to be included are design water surface profiles, coefficient and discharge curves, and other plotted data or tabulations. Hydrologic aspects of physical model tests should be included when the design is based on a model study.